tioned illustrious amateurs, both living and dead, whose work has added greatly to our knowledge of nature.

The abundance of diatoms in clear waters was indicated, and apparatus useful in making collections were exhibited and described. Methods of separating diatoms into pure condition were explained in outline, and those depending on motile activity were emphasized as preferable in many cases to chemical treatments and laborious decantations. Sedentary forms, such as *Synedra*, growing on algæ, etc., may often be separated by exposing the gathering to sunlight, when the diatoms fall off the buoyant mass and deposit as a perfectly clean layer on the bottom of the bottle. Filamentous forms may usually be cleaned by gentle agitation in distilled water, exposure to sunlight causing flotation, and by other similar means. Motile forms, if in gelatinous aggregates, as *Cymbella, Gomphonema,* are put into a Petri dish with distilled water and permitted to wander out of the unpromising aggregate into thin films or pure groupings on the bottom of the vessel. Unequal lighting of the dish will generally cause preponderant groupings toward the light. The clean frustules are transferred to watch-glasses of distilled water, working with a capillary pipette and low-power binocular microscope. Tenacious or leathery layers of *Nitzschia,* on stones in rapid waters, are cut off with a knife, and after freeing from detachable mud are left in a small flat bottle of distilled water for 24 hours. The diatoms expand on the upright glass walls, especially upon the lighted side, into thin, coherent films of great purity, detachable with a sharp needle or similar instrument. Larger Naviculæ not coherent, but aggregated in patches on the bottom of a spring, are lifted with as little mud as possible, and separated from organic and inorganic flocculence in the same bottle; and a separation in course of *Pinnularia,* was exhibited, in which the large frustules could be seen, with the aid of a pocket lens, expanding on the glass.

Distilled water, if well aerated and uncontaminated with metals, especially copper, seems to stimulate the desired activities. The diatoms having been segregated by such means, they are transferred with a capillary pipette to a clean cover-glass, dried and burned to whiteness. The glass is supported on a thin piece of platinum, which in turn rests on a piece of fireclay ground flat. The fireclay is heated to bright redness with a gas burner, the platinum showing only a faint glow. In about fifteen minutes the frustules are free from organic matter, and the mount may be made in the usual way with Canada balsam or styrax.

The biological method of cleaning, apart from its facility in handling sparse or unpromising material, gives opportunity for interesting observations on the living diatoms.

On Diatoms of Philadelphia.—MR. CHARLES S. BOYER described the diatomaceous flora of Philadelphia, stating that he was able to add seventy-one names to the catalogue of species heretofore re-

corded. Some are entirely new to the United States, while others are quite rare.

Among these may be mentioned *Actinocyclus barkleyi aggregatus* Rattr., *Navicula placenta* Ehr., *Polymyxus coronalis* L. W. Bail, *Amphiprora conspicua* Grev., *Nitzschia clausii* Hantzsch.

Brackish and marine forms occur in the blue-clay deposits in various parts of the city.

Other rare species were described.

The entire flora of the city and immediate vicinity numbers probably three hundred distinct species. Illustrations of many diatoms were shown, including some of those found in the city water supply.

The Critical Point in Liquids.—MR. HUGO BILGRAM remarked that of the various inclusions found in quartz those of liquid dioxide of carbon are among the most interesting. Within more or less irregular microscopic cavities are inclosed three distinctly visible fluids: water, liquid dioxide, and within this a bubble of dioxide vapor. When the temperature is raised, the liquid dioxide is turned into vapor and the bubble disappears. Upon cooling the object, the vapor bubble suddenly reappears. In many cases not a single, but a number of bubbles make their appearance, making it look as if the inclusion were boiling. How is this phenomenon to be explained?

It is well known that water boils when heated to 100 degrees Celsius; but if exposed to a reduced pressure, its boiling point is lower, and if exposed to a pressure higher than that of the atmosphere, the boiling point is higher. If the relation of the vapor pressure to the temperature is represented by a curve, it can be seen that at a point somewhat over 300 degrees the pressure curve extends to infinity. This shows that above this temperature water cannot exist in liquid form, no matter how high the pressure, and this degree of heat is termed the "critical point."

All volatile liquids show the same peculiarity, but the critical point is different for different liquids. That of dioxide of carbon is in the neighborhood of 28 degrees Celsius, and the phenomena above described present the change of dioxide of carbon from the liquid to the gaseous state and *vice versa* at a temperature which is near the critical point. From the peculiar features of the phenomena very interesting inferences can be derived.

There is a sharp distinction between fluids and gases, as we know them, the principal differences being in relation to elasticity, cohesion, and expansion by heat. While gases are highly compressible and have a high coefficient of expansion by heat, compressibility of liquids is very slight and expansion by heat not very great. While gases readily expand if the space of their confinement is increased, liquids maintain their volume. In gases there is a total absence of cohesion, while in the case of liquids the molecules cohere. When water or any other liquid is converted into steam, the change from the liquid to the vapor state is abrupt. But the phenomena exhibited